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A MARKETING STRATEGY ON PHOTOVOLTAIC MARKET

Coita Dorin Cristian
Universitatea din Oradea, Facultatea de Ştiinţe Economice, dcoita@uoradea.ro

Abstract: Photovoltaic is an increasingly important energy technology. Deriving energy from the sun offers numerous environmental benefits. It is an extremely clean energy source, and few other power-generating technologies have as little environmental impact as photovoltaic. In this article we explored some dimensions of photovoltaic market and suggested a marketing strategy for solar panels manufacturers

Key terms: Photovoltaic Market, Solar Panels, Strategy

Photovoltaic Market

Photovoltaic is an increasingly important energy technology. Deriving energy from the sun offers numerous environmental benefits. It is an extremely clean energy source, and few other power-generating technologies have as little environmental impact as photovoltaics. As it quietly generates electricity from light, photovoltaic produces no air pollution or hazardous waste. Moreover, it does not require liquid or gaseous fuels to be transported or combusted. Also, because its energy source, sunlight, is free and abundant, PV systems can offer virtually guaranteed access to electric power.

There are basically two technologies for producing solar panels:

1. Solar panels with Poly Crystalline silicon based technology. This technology has several characteristics:

a) **Is mainly based on silicon as raw material**. The global silicon market is quite restricted and closed. The price of silicon increases constantly. For some years silicon supply (processed silicon) was the bottleneck of the PV industry. Due to the vast expansion of production capacities of known players and the introduction of new capacities by new players, silicon capacities will reach 8-10 GWp by 2010. As silicon is a major raw material for c-Si technologies (93 % in 2006), silicon capacities predefine the upper production limit for the industry.

b) **The panel is useful only for one side**.

c) **The sun has to be perpendicular on the panel.** In order to be effective, the sun has to be perpendicular on the panel, so a motor is needed for each panel to rotate it after the sun.

d) **The shadow effect.** This effect makes the capacity of producing energy to decrease dramatically when there is a cloud or some shadow on the panel.

e) Production of panels it's not environmentally friendly. There are a lot of chemical substances needed for producing Poly Crystalline silicon panels which makes the production to be contaminating.

f) High prices of the panels. Prices express the high costs of raw materials and the cost of the production. Estimated production cost increases to 3,5 Euro per W.

2. Thin Film Technology.

Approximately 4 GW of Thin Film capacity is expected to be available by the end of 2010. This would represent 20 % of the overall module production capacity. Although all technologies face high expansion rates, Thin Film capacities are currently expanding at a faster rate than capacities for other technologies.

The TF industry expects to penetrate some of the traditional markets for PV, while creating entirely new applications categories, based on TF PV's cost, weight and flexibility. Integrated building products are particularly attractive to the TF PV maker, because the requirements of this sector fit well with the characteristics of TF PV and the addressable market is large. A potential for TF PV in the mobile and disposable electronics markets has also attracted interest in certain quarters.

Advantages of the Thin Film Technology are:

- Effective: This technology thin-film silicon allows reaching the lowest device cost per WP. Estimated cost per WP is 90 cents (EUR).

- Costs, weight and flexibility.
- Future Potential: this technology shows major development potential for the future. Higher energy harvest is enabled by tandem cells and future development
- Less silicon: large area thin-film silicon solar modules require only a fraction of the expensive silicon absorber material. In fact, it requires silene gas which is a waste of silicon factories
- High productivity: The solar cells are deposited directly on large area glass substrates resulting in very high productivity
- Plenty of raw materials: No shortage on any used device materials exists
- Environmentally friendly: The device materials used are all environmentally friendly
- Can be used in future functions of the buildings: By their large size and attractive, uniform appearance thin-film silicon solar modules are also ideally suited for building integrated photovoltaic (BIPV) solutions. Thus, total cost can be reduced by combining photovoltaic power generation with building functions.
- Can be used as glass for windows: As a building material A-Si can be used as glass for windows, can be cut in pieces, doesn't require curtains, better technology then termopan

Actual Market

According to EPIA's study *Global Market Outlook for Photovoltaics until 2012*, the solar PV market has been booming over the last years and it is forecasted to confirm this trend in the coming years. By the end of 2007 the global cumulative capacity exceeded 9 GWp. The European Union contributes to around 50 % of the global cumulative capacity.

PV market deployment is to a large extent dependent on the political framework of any given country. Support mechanisms are denned in national laws. The introduction, modication or fading out of such support schemes can have profound consequences on PV industries. PV Market forecasts therefore depend on a deep understanding of the political framework.

Future Development of the Market

An annual growth rate in excess of 30 percent is anticipated for the coming years.

European Photovoltaic Industry Association has derived 2 representative scenarios for the future development of the PV industry.

The Pessimistic scenario: This scenario is based on the assumptions of a 'business as usual' scenario which does not assume any major enforcement of support mechanisms.

The Policy driven scenario: In this scenario, EPIA expects the follow up and/or introduction of support mechanisms, namely feed-in tariffs, in a large number of countries.

Current developments of European Energy Policy and forecasts on prospective legislation: In January 2007 the European Commission has issued a Communication proposing a comprehensive new Energy Policy for Europe aiming at combating climate change and ensuring security of energy supply in Europe, while boosting its competitiveness. The new strategy includes a legally binding target of a 20% share of renewable energy in European overall energy mix by 2010.

New Renewable Energy Legislation under preparation

The European Commission is working on a Proposal for a new framework Directive for the promotion of renewable energy energy sources. It is expected tht this Directive will impose on Member States the obligation to have a certain amount of internal consumption of energy supplied through renewable energy sources by 2020. The final target of this Directive will be to have 20% of European energy consumption supplied through renewable energy sources by 2020.

Countries

The market for solar panels contains countries in Europe (Germany, Spain, Italy, Greece, France, Portugal) and also USA, China, Japan, South Korea, India.

Europe was the largest regional market for solar photovoltaics (PV) in 2006. The European Major PV markets of Germany, Spain, Italy, Portugal, France and Greece accounted for 1,125 megawatts of PV demand. Dominant among this group was Germany at 968 megawatts in 2006, whose size made it by far the largest in the world. In this market, private individuals in residential applications accounted for 41% of the market. There was a downward trend in system sizes as the share of large PV projects of MW scale fell, mainly due to changing economics for ground-mounted systems and for the customer segment of Investor Groups. The share of thin films in ground-mounted installations grew strongly, with a single manufacturer as the main beneficiary.

Spain secured second place among the European markets as it rapidly grew to 110 megawatts in 2006 from 35 megawatts a year earlier. The Community of Navarra was the largest regional market.

Revisions to feed-in tariff programs during 2006 and early 2007 have provided the platform for rapid demand growth in Spain and Italy, which are now categorized as the "second tier" Major European PV markets. France, Greece, and Portugal remain at an earlier stage of market development, each with their own constraints over their future growth, which mean that these countries will remain third tier markets over the forecast period (2007-2011).

As for the United States and other countries there is a growing international demand. Growing markets include those where factors such as high electricity prices and subsidies or other incentives improve the cost-effectiveness of PV systems. These prices represent those for grid-connected customers.

Germany is expected to remain the market leader and even increase its market size considerably over the next years. The biggest growth is foreseen for the Rest Europe in particular in countries such as Spain, Italy, France and Greece. The USA will also be able to use its vast solar potential and will challenge Germany as the Number 1 PV country. PV development in Japan will, to a large extent, depend on the decision of the Japanese government to reintroduce, or not, a support program. Also the Rest of Asia, in particular India and South Korea, will face increasing demand for PV.

Market Segments

A. On-Grid (Grid-Connected) Customers

- Residential customers: houses, villages and small communities
    - Existing residential homes
    - New home constructions
    - Large buildings

On-Grid Sales Predominate: The markets for solar PV have undergone a dramatic shift in the last 5 years. Prior to 1999 the primarily market for PV was in off-grid applications. However now over 78% of the global market is for grid-connected applications where the power is fed into the electrical distribution network. The advantages of TF panels are that they are cheaper as usual monocrystalline or poly cristalline panels.

- Industrial customers
    - Big Factories using the roofs as a surface for installing solar panels.
    - Stables, farms and farm houses, using roofs for solar panels.
    - Big buildings (offices, halls) designed for using Solar Panels instead of regular windows.

B. Off- Grid Customers

- mid-size industrial:
    - Small Consumers of Electricity
    - Weather Stations
    - Semaphors
    - Water Pumping
    - Rural electrification

- Telecommunications

C. Specialized Producers of Electricity

Solar Farms will be the most important market segment. A 'solar farm' is a grid-connected solar power plant based on several subsystems, each with their own investor. The electricity produced is is sold to the local energy utility companies for an attractive feed-in tariff, guaranteed by national laws.

International Targets for PhotovoltaicManufacture

As is in other developing technologies, a critical element in the development and growth of the solar PV industry is the setting of long-term growth targets for the industry. The following table gives examples of targets for PV in other countries.

Figure 1: Examples of National Targets for PV

Source: The Canadian Solar Industries Association, www.cansia.ca

Contry	Target	Agency	Date	Notes
Global	**205,000 MW by 2020**	**Greenpeace & European Photovoltaic Industry Association**	**2004**	**Generation PV**
Germany	**300 MW by 2005**	**National government**	**1999**	**"100,000 solar rooftop program," 2004 – 794 MW installed**
Japan	**100,000 MW by 2030**	**National government**	**2004**	**"PV2030"**
Japan	**5,000 MW by 2010**	**National government**	**2002**	**2004 – 1,100 MW installed**
Holland	**12.5 MW by 2000 250 MW by 2010 1,500 MW by 2020**	**National government**	**1997**	**2004 – 49 MW installed**
California	**3,000 MW by 2017**	**California Public Utilities Commission**	**2005**	**"California Solar Initiative"**
South Korea	**1,300 MW by 2012**	**National government**	**2004**	
Thailand	**250 MW by 2011**	**National government**	**2004**	
Canada	**1,000 MW by 2025**	**Canada Pollution Probe**	**2004**	**A Green Power Vision and Strategy for**

Contry	Target	Agency	Date	Notes
				Canada

A Suggested Marketing Strategy

Marketing efforts will be done with the contribution of two separate departments within company:

1. Marketing: Marketing Responsible and externalized consulting company
2. Sales: Sales Responsible

Marketing will have following responsibilities:

- Research and studies on global market: demand, competition, technologies, policies
- Analyze the international environment regarding solar photovoltaic products and technologies
- Identify market segments and choosing the most profitable segments for the company
- Assist in building business strategies and policies
- Know the needs of existing and future clients and collaborating with clients for suggesting the best concepts for using products and technologies
- Promote the usage of the products as a technology to be used in residential and industrial building sectors. Develop relationships with architects and building companies.
- Build and use relevant marketing mixes for different market segments
- Build and maintain the company's image and reputation.
- Develop manufacturer identity and brand.
- Establish the presence of the company on the Internet. Conceive E-marketing strategy, programs and campaigns, identify and use the e-marketing tools.
- Build and maintain the network with suppliers, clients, regulating authorities, professionals, ecologist organizations
- Organize the presence of the company to international seminars and conferences regarding PV products, technologies, green energy and social responsibility.
- Establish the network of sales offices and representatives in target countries.
- Develop social responsibility programs
- Supervise and assist the sales force. Build direct marketing campaigns.
- Coordinate with other departments of the company

Sales will have following responsibilities:

- Identify potential clients
- Establish the offer, communicate and negotiate the terms of the transactions
- Negotiate and sign the contracts
- Report sales, sales trends, market situation
- Manage the sales force: recruit select and train the sales representatives
- Manage the overseas sales representatives

Additional sources of information

1. www.absenergyresearch.com
2. www.energybusinessreports.com
3. www.cansia.ca
4. www.epia.org
5. www.solardaily.com
6. www.nrel.gov

7. www.seia.org